

REMARKS/ARGUMENTS

Favorable reconsideration of this application is requested in view of the above amendments and in light of the following remarks and discussion.

Claims 1-11 are pending. Claims 1-6 are withdrawn. Claim 7 is amended. Support for the amendment to Claim 7 can be found in the published application at numbered paragraphs [0044]-[0046], for example. No new matter is added.

In the outstanding Office Action, the Restriction Requirement dated February 1, 2006, was made Final. Claims 7 and 9-11 were rejected under 35 U.S.C. § 102(b) as anticipated by Tsuchiya et al. (U.S. Patent No. 5,716,534, herein "Tsuchiya"). Claims 7-9 and 11 were rejected under 35 U.S.C. § 102(b) as anticipated by Koshiishi et al. (U.S. Patent No. 5,919,332, herein "Koshiishi"). Claim 8 was rejected under 35 U.S.C. § 103(a) as obvious over Tsuchiya in view of Koshiishi. Claim 10 was rejected under 35 U.S.C. § 103(a) as obvious over Koshiishi in view of Tsuchiya.

Regarding the rejection of Claims 7 and 9-11 as anticipated by Tsuchiya, that rejection is respectfully traversed by the present response.

Amended independent Claim 7 recites:

A plasma processing apparatus comprising:
a lower electrode for placing an object to be processed thereon;
an upper electrode disposed above the lower electrode so as to oppose it;
an adjusting mechanism for adjusting a spacing between the upper and lower electrodes by raising or lowering the lower electrode; and
a high-frequency power supply for applying high-frequency power to at least one of the upper and lower electrodes, the high-frequency power being applied to either one of the electrodes to cause plasma igniting, wherein
the adjusting mechanism has a drive mechanism configured to make the spacing larger before the time of plasma extinction than during plasma processing of the object to be processed placed on the lower electrode.

Accordingly, the drive mechanism makes the spacing before the time of plasma extinction larger than the spacing during plasma processing.

The outstanding Office Action asserts that Tsuchiya discloses “an adjusting mechanism 3 for adjusting a spacing between the upper and lower electrodes 21 wherein the adjusting mechanism 3 has a drive mechanism for making the spacing larger at least at the time of plasma extinction than during plasma processing of the object to be processed placed on the lower electrode.”¹

However, Tsuchiya states that “[s]upply of the etching gas is stopped, the interior of the process chamber 2 is purged, and the susceptor 4 is moved downward to the lower position again, as shown in Fig. 27.”² This means that the susceptor (4) is moved downward to the lower position **after** the time of plasma extinction. This is apparent from the above-noted quotation because plasma must be extinct when stopping the supply of the etching gas and purging the interior of the process chamber.

Accordingly, Tsuchiya does not disclose a plasma processing apparatus “wherein the adjusting means mechanism has a drive mechanism configured to make the spacing larger **before the time of plasma extinction than during plasma processing** of the object to be processed placed on the lower electrode” as recited in amended Claim 7.³

The outstanding Office Action asserts that Koshiishi describes a plasma processing apparatus “wherein the adjusting mechanism 7, 8 has a drive mechanism for making the spacing larger at least at the time of plasma extinction than during plasma processing of the object to be processed placed on the lower electrode.”⁴

However, in describing the operation of the drive motor (8), Koshiishi states:

At first, after the pressure of a load lock chamber 52 is changed to be equal to the pressure of a processing chamber 2

¹ Outstanding Office Action, page 3.

² Tsuchiya, col. 13, lines 9-11.

³ Emphasis added.

⁴ Outstanding Office Action, page 4.

or after the pressure of the load lock chamber 52 is increased to be higher than the pressure of the processing chamber 2 to a predetermined extent, the gate valve 51 is opened and a wafer W is conveyed into the processing chamber 2 by the conveyer 53. In this state, the susceptor 6 is moved down by operation of a drive motor 8 and is kept in a stand-by state for receiving a wafer W. Then, the wafer W is mounted on an electrostatic chuck 11 by the conveyer means 53. Thereafter, the conveyer means 53 is kept aside, and the gate valve 51 is closed. In addition, the susceptor 6 is moved up to a predetermined position by operation of the drive motor 8.⁵

Therefore, the susceptor (6) is moved down by operation of a drive motor (8) **at the time of a stand-by state of plasma processing**, i.e., before the beginning of plasma processing.

In describing an alternate embodiment, Koshiishi states:

At first, after the gate valve 51 is opened, a wafer W is conveyed into the processing chamber 2 by the conveyer means 53. In this state, the susceptor 6 is moved down by operation of a drive motor 8 and is kept in a stand-by state for receiving a wafer W. Then, the wafer W is mounted on an electrostatic chuck 11 by the conveyer means 53, and thereafter, the conveyer means 53 is kept aside, and the gate valve 51 is closed. In addition, the susceptor 6 is moved up to a predetermined position by operation of the drive motor 8. Subsequently, the internal pressure of the processing chamber 2 is reduced by a vacuum suction means 41, to a predetermined pressure value. Thereafter, a CF₄ gas is supplied from a processing gas supply source 27, and the pressure of the processing chamber 2 is set to and maintained at 10 mTorr, for example.

Thereafter, the upper electrode 21 is supplied with a high frequency power of frequency 27.12 MHz from the high frequency power source 47, and then, a plasma is generated between the upper electrode 21 and the susceptor 6.⁶

Again, the susceptor (6) is moved down by operation of a drive motor (8) **at the time of a stand-by state of plasma processing**, i.e., before the beginning of plasma processing.

Accordingly, Koshiishi fails to disclose a plasma processing apparatus, “wherein the adjusting mechanism has a drive mechanism configured to make the spacing larger before the

⁵ Koshiishi, col. 11, lines 44-57.

⁶ Koshiishi, col. 22, lines 1-19.

time of plasma extinction than during plasma processing of the object to be processed placed on the lower electrode” as recited in amended independent Claim 7.

As neither Tsuchiya nor Koshiishi discloses a plasma processing apparatus, wherein an adjusting mechanism has a drive mechanism configured to make a spacing between an upper and lower electrode before a time of plasma extinction larger than during plasma processing as recited in amended independent Claim 7, no reasonable combination of Tsuchiya and Koshiishi would include all of the features recited in amended independent Claim 1. Accordingly, Applicants respectfully submit that amended independent Claim 7 patentably distinguishes over any reasonable combination of Tsuchiya and Koshiishi for at least the reasons discussed above.

Claims 8-11 depend, directly or indirectly, from amended independent Claim 7. Accordingly, Applicants respectfully submit that dependent Claims 8-11 patentably distinguish over any reasonable combination of Tsuchiya and Koshiishi for at least the same reasons as amended independent Claim 7 does.

For the foregoing reasons, it is respectfully submitted that this application is now in condition for allowance. A Notice of Allowance for Claims 7-11 is earnestly solicited.


Should Examiner Crowell deem that any further action is necessary to place this application in even better form for allowance, she is encouraged to contact Applicants' undersigned representative at the below-listed telephone number.

Respectfully submitted,

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